



DOWNSIZING DARWIN



AN INTELLIGENT FACE
FOR EVOLUTION

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DOWNSIZING DARWIN: An Intelligent Face for Evolution
For the general reader

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Richard Dawkins proudly defends Darwinism in his popular book *River Out of Eden*. A river of genes springing from the blind fortuitous survival of DNA sequences is the sole determining factor in the evolutionary process. Only DNA sequences he insists. But his supporting arguments are riddled with flaws. How strange that the whole of evolutionary biology should be infected with contradictions. Blind belief without foundation is flaunted as vigorously as any repressive religion. Nor is creationism the only option. The evidence across the broad sweep of time and space confirms that the evolutionary process unfolds in an ordered way that is implicitly

intelligent.

Intelligence by its nature spans time and space. It integrates history. It is a living process that may learn by trial and error but reinvests that learning up through hierarchical levels in the long climb toward sentient awareness. Left exclusively to genetic linkages, lessons from whole lineages of extinct species spanning eons would be lost forever. Even plants display some sentience, from vascular systems that reach for the sky, to flowers that attract pollinating insects, anticipating processes extended in space and time. The invertebrates from flatworms to flies explore an array of sensory-motor systems spanning space and time at accelerated rates. The vertebrates from crocodiles and cows to chimpanzees add conscious reflection of emotional patterns, providing ever higher discretionary capacities to span space and time. Lastly, language empowers humans to integrate the whole of space and time through extended ideas. But this left-brain capacity invites a right-brain spiritual sense of propriety. And both brains are fueled by an emotional apparatus harnessed to the ancient brains of the crocodile and horse integrated into our cerebral anatomy. We three-brained creatures are specifically structured to span space and time. With anciently rooted aspirations fueled by our animal brothers we are obliged to reach for another rung in evolution's ladder and grasp the essence of intelligence implicit in the cosmic order.

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In the academic world it is usual for scientific contributions to be assessed by a peer review process, that for all of its weaknesses is better than nothing. A peer review process can cut both ways, however. Biases inevitably come to play, as they do in all human endeavors, and a peer review process can often serve as much to promote them as to expose them. It is only over time, sometimes over periods of many centuries, that biases gradually get weeded out from our garden of acceptable ideas.

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CHAPTER 1 In the Beginning the Preface

Preface to River out of Eden:

Dawkins begins his book with a poem by Piet Hein:

Nature, it seems, is the popular name
For milliards and milliards and milliards
Of particles playing their infinite game
Of billiards and billiards and billiards.

There you have the bias of science wrapped up in a nut shell. Everything is the result of local interactions between elementary particles, going all the way back to the big bang. This is the view of the cosmic order held as immutable truth by mainstream science—an article of faith without a shred of supporting evidence.

Think for a moment. If all being, including the entire universe, is truly just a random game of atomic billiards, then there is no real or transcending basis to values of any kind, including truth. Therefore there can be no basis for saying that everything can be reduced to atomic billiards, for this mindless view offers no basis whatever for truth itself. It is a self contradictory position. It presumes a thing as true while implicitly denying there is such a thing as truth. Truth can hardly be the accidental result of atomic billiards.

One should be able to stop right there. The inherent contradiction should be seen by those who would maintain the position, discouraging them from holding to it. They should look for a more self consistent view, for an implicit order that allows of truth. . Why don't they then? Because they do not have access to a practical alternate paradigm that will allow us to understand how intelligent processes work.

I would like to be kind and give Darwinists the benefit of a few doubts that may emerge here and there, and overlook weaknesses in their arguments in the hope that their intentions are directed toward an impartial determination of the truth. But they don't see how they can open the door to other possible options because the alternative is creationism. This is not just a matter of a difference of opinion over a few minor issues. Arguments on both sides are riddled with obvious flaws and flaunted in the face of solid evidence to the contrary. Such an entrenched approach on both sides carries with it a good measure of self-deception. They are reactionary positions in the evolutionary arena.

These opposing positions have little to do with the facts of the matter. They would dispense with most of philosophy, most of psychology, and proceed to contradict the laws of thermodynamics, not to mention the impact on our cultural traditions. On the scientific side this blind one-gearishness would ultimately reduce us all to mindless greed and obsessive action, all in the guise of logical argument.

Darwinian evolutionists must choose to ignore a large body of contradictory evidence in order to foster their beliefs. Their faith in the blind process of "natural selection" prejudices their efforts. On the basis of Dawkins' book, it will be shown that extreme

Darwinism is a blind belief without foundation, as fervent as any religion and with all the earmarks of self-deception.

To suggest, as Dawkins does at the outset, that the Darwinian view has poetic beauty and inspirational value is to seriously compound the deception, for now we are treading in a fanciful world of double speak. It is inconsistent with Dawkins' argument to throw in a healthy dose of values, including beauty and inspiration. Beauty and inspiration are larger than the bare facts of life. They are universally recognized qualities that are implicitly associated in some way with ultimate truth, transcending physical existence. We all sense their transcendent quality and we credit their ephemeral essence as real. Values determine everything that we do. But here we are urged to use them in order to justify a blind materialist view with no self-consistent place for values at all. At the same stroke we are to believe that this is in accord with sound reason.

That's double speak. After all, no intelligent reader is likely to deny a place in their lives for beauty and inspiration. Are atomic accidents beautiful? We can't even see them, much less assert with such confidence that they determine our being. Who really wants to live in a world reduced to atomic billiards? Who really believes it? If no one really believes it, yet say that it is so, why do they make such efforts to sustain the deception? Why did Darwin go to all the trouble in the first place? No one can deny the "extreme perfection and complication" of nature's mechanisms, but to suggest that Darwin's hypothesis explains them is an unsubstantiated leap of blind faith. Why did Darwin take this leap?

Is it as Richard Dawkins suggests, that nature's complex mechanisms fulfill an apparent purpose? Purpose again implies values in anticipation of achieving a future objective. We take medicine for the purpose of curing a disease. We say it is valuable for achieving that anticipated result. Can we invest genes with the capacity to anticipate the future? Purpose implies intelligence at work to achieve a meaningful result. Then how can all creation be the accidental result of blind atomic billiards? We shall see that double speak pervades the arguments for Darwinism.

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CHAPTER II The Digital Adam and Eve

River Out of Eden - Ch. 1-The Digital River:

The double speak proceeds in Dawkins' first chapter by suggesting that religions are grounded in ancestor worship and that it is real ancestors not supernatural gods that hold the key to understanding life. Is religion really grounded in ancestor worship? According to the founders they are based upon direct experiential insights into a transcendent and intelligent creative order.

The point here is not to justify traditional religions, nor the cultural biases that have become associated with them. The point is that Darwinism is an unsubstantiated belief that cannot claim to be based upon direct experiential insight into the creative process. It is pure conjecture, yet Dawkins insists that life is just digitized information in a river of genes out of Eden.

Dawkins points out that ancestors were survivors and are rare compared to descendants, but this is not a very "astonishing" fact as he claims. It is hardly a profound or meaningful basis for a new belief system to explain the whole creative order.

If a successful life is measured solely by prolific numbers of offspring, thus determining successful genes, and if this is the sole reason why birds fly well, fish swim well, and why we love life, sex and children, then the selfish gene is ultimately the

only reality
and greed is the only moral. By this standard we may be able to understand why we "love" our own children or close kin, but why should we love or even respect the children of others, except as potential mates to propagate our own greedy genes? Social relationships all become reduced to strategic alliances of mutual greed. Better to kill off others outside our alliances to make more room for own greedy genes to succeed, at least to the extent that we can do it successfully.

Mother Theresa was obviously severely deranged, to say nothing of Jesus Christ or the Buddha, or the countless selfless contributors to enhancing the human condition. And childless souls like Isaac Newton, Copernicus, Michelangelo, and Leonardo were likewise all losers, unless we are to think of them as worker ants foregoing offspring so that others, who might happen to share some of their genes, may better survive. The most intelligent and compassionate among us must be blind slaves of genes, along with the most mindless of the propagating majority. This view of Darwinism denigrates us all. It would leave us bereft of any sense of meaning to our being except the blind gratification of animal drives. Insight into the creative order begins and ends with our own greedy flesh.

Darwin himself did not endorse such an extreme view. He took issue with the dogmatic Genesis view held by the church, however he was not an atheist in the same extreme sense that a modern Darwinist is. Nothing was known of molecular biology during his time.

Genes, it is claimed, are not upgraded or otherwise altered in the using. They are passed on unchanged except for very rare random errors, a few of which may bestow certain advantages. Now how does any biologist know with such supreme certainty that this is so? How does one know that a so-called "error" is really an error, not just sometimes, or most of the time, but always. Since there is no decisive "proof" available, this must be accepted as an article of faith, along with the rest of the package. Any evidence to the contrary is thus precluded from investigation, even if some worthy soul points it out. (And some biologists have done so. One who has produced compelling evidence is Professor Michael J. Behe in his book *Darwin's Black Box*, Touchstone books, NY, 1998.)

Genes, in this strange language of double speak, are then invested with values such as companionship. Genes must be good at working cooperatively with other genes of the species, it is maintained, while at the same time maintaining that they compete with other genes. "Good genes" know when and how to be altruistic to good collective advantage. These clusters of inanimate molecules that we call genes are invested with complex intentions and value judgments. This is quite apart from any sense of social propriety that we may entertain as individuals, and yet Dawkins implies that our genetic inheritance predetermines our judgments as well. If our judgments are in fact predetermined why does Richard Dawkins feel a need to sway the world to his view? Why should anyone care?

Now genes of different species are said to be in different rivers that don't have to cooperate, at least not in the same way, according to Dawkins. It is an inverted river that keeps branching downstream, all the rivers diverging from common ancestors, all the way back to invertebrates, plants and bacteria and presumably to the first living cell, however it came to get

started.

It is maintained that major divergences of rivers, such as the mammals from the reptiles, did not in fact represent major events at the time, that they were no different in kind to any other divergence in species brought about by geographical separation. This is a little like saying that because a work of art begins with a single meaningless pencil stroke, the end result is only a meaningless scribble. Accidental geographical separation is also considered necessary in order for diverging species to evolve in parallel.

Both the fossil record and the living record provide powerful evidence to the contrary. The first mammals diverged in Triassic times, over 200 million years ago, when the reptiles were just beginning to bloom into a great divergence of species. Yet during the reptilian period the mammals experienced very little evolution apart from refinements associated with warm blooded activity, all being confined to small rodent-like creatures until nearly the end of the reptilian reign. The reptiles completely dominated the scene, then abruptly became almost totally extinct about 65 million years ago.

Despite all the reptilian "success," it wasn't mammalian divergence from the end of the reptilian period that survived and blossomed in its turn. It was those tiny shrew-like rodents that had emerged near the beginning of the reptilian period, and that had undergone little change for 160 million years, that suddenly and rapidly exploded into a great divergence of mammalian species ancestral to those that we know today. ...

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CHAPTER III Out of Africa

River Out Of Eden – Ch. 2- All Africa and Her Progenies:

Double speak gets underway again early in this chapter, even though Dawkins generally deals more with hard evidence. An extreme version of so-called "cultural relativism" is brought on the carpet for a dressing down, and one wonders why Dawkins should do this, if not to discredit by inference more than the target. Dawkins has a tendency to use facts out of context to tar everyone who disagrees with the same brush, although he does make allowances in a footnote for more "sensible" cultural relativists. His criticism is directed against those who suggest that modern science has become a creation myth, hardly different in kind to the creation myths of earlier cultures.

"Show me a cultural relativist at thirty thousand feet and I'll show you a hypocrite," he exclaims. Of course airplanes really fly, and it really is a credit to our understanding of certain physical principles that they do. We have learned a few things in the course of our social evolution. But we are talking about creation myths as they may or may not relate accurately to the creative process, not about the physics of flight.

Are we to believe that because we can machine parts and assemble them into a workable aircraft that we can use the same principles to make a canary? Can we use the same principles to model the whole of creation? Can we reasonably extrapolate many orders of magnitude beyond energies ever achievable in particle accelerators, to determine events in a supposed big bang origin of the entire universe? Can we reasonably employ notions of an assumed space-time continuum to calculate when a

physical origin to the universe occurred, despite an inability to unambiguously identify either space or time as real a priori entities?

Space and time and force and so on are ideas invented by man from physical observations to help us cope with everyday experience. The origin of the universe is itself a contradiction in terms for it nullifies these physical concepts and the principles upon which they are based. This is well known and yet this fundamental fact is ignored. We are supposed to believe that this whole incredibly vast universe was once compressed into a volume infinitely smaller than a single proton. If everything was once compressed into a singularity the size of nothing without distinguishable order within it, and nothing outside it, then all of the laws of nature on which all theories are based are refuted. This contradiction in terms divorces us from our own experience. The big bang theory does not allow of confirmation in experience, not ever. It is a blind belief in a mathematical concoction. Is this not the stuff of myth? ...

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CHAPTER IV On Winning by Cheating

River Out Of Eden – Ch. 3 - Do Good By Stealth:

Double speak even creeps into the title of this chapter of Dawkins' book. Values, good and bad, are touted as both the motive and the modus operandi of a mindless creative process.

The title refers to a discussion of how the orchid has evolved to imitate both the appearance and smell of the sex organ of the female wasp, thus attracting male wasps to copulate, philandering creatures that they are, and promoting its own pollination. Dawkins gets into his discussion by quoting at length from a personal letter from an American minister who read of the phenomena in National Geographic. The man was so impressed that he came to believe "...that some kind of God in some kind of fashion must exist, and have an ongoing relationship with the processes by which things come into being." The man consequently abandoned atheism and embraced the church.

This letter has apparently disturbed Dawkins, for he responds publicly to the minister's private letter at length: "...How, I want to ask the minister, can you be so sure that the wasp mimicking orchid (or eye, or whatever) wouldn't work unless every part of it was perfect and in place? Have you in fact given the matter a split second's thought? Do you actually know the first thing about orchids, or wasps, or the eyes with which wasps look at females and orchids? What emboldens you to assert that wasps are so hard to fool that the orchid's resemblance would have to be perfect in all dimensions in order to work." What follows from the pen of an eminent biologist obviously seeking converts to his mindless position is good cause to be disturbed, for he himself has no basis on which to be so sure of blind accident as the sole creative agent. His own logic is riddled with holes.

Dawkins states that "The purpose of this chapter is to destroy the argument that complicated contrivances have to be perfect if they are to work at all." Now despite what Dawkins says, this really isn't the purpose of the chapter. Dawkins' purpose is clearly to destroy any impression of intelligence at work in the creative order. Since the minister linked an intelligent agent of some kind to perfection, Dawkins wants to exploit this statement and erode any suggestion that complicated contrivances must be

perfect from the outset, then maybe he can float this to triumph over any suggestion of intelligence at work at all in the evolutionary process. In other words, he hopes to succeed by stealth, which he feels would be good. He has contrived the approach to exploit the minister's sentiments.

Although this is clearly his hope, the two things are not synonymous. Intelligence does not imply perfection in all things from the outset. We know from experience that if we exercise a little intelligence that we can learn by degrees and adjust our course of action accordingly toward a satisfactory result. But the Darwinian position does not allow of intelligent feedback or assessment of alternatives prior to selecting a course of action. Evolutionary mutations are seen as rare random accidents that just happen to have a survival advantage that becomes established after the fact. There is no intelligent anticipation allowed in the process, no intelligent feedback, no prior value judgments to direct the evolutionary process toward a needed result.

Having created a straw man, Dawkins sets out to destroy him by first running through many examples of creatures being fooled, from insect to human. ... Evolution certainly hasn't had an easy time exploring the integration of experience.

All of this is intended to show that a very crude resemblance between an orchid and a female wasp might well be sufficient. "The general lesson we should learn is never to use human judgment in assessing such matters." Yes, Richard Dawkins really says this in print. If we are not to use human judgment, what kind of judgment are we supposed to use?

Then he emphasizes again his stated purpose of the chapter, to defeat the fallacy of what he dubs "the Argument from Personal Incredulity." We are apparently not entitled to disbelieve the exclusive Darwinian viewpoint. Of these arguments he says, "Time and again, it has proved the prelude to an intellectual banana-skin experience." Therefore it must always prove futile to disbelieve the Darwinian paradigm, is the implication in his statement. Now it must be conceded that not many people will take the time and effort to carefully sift through the verbiage masking and distorting the evidence, to sort out word by word the gross transgressions of common sense that pervade the literature. But that does not justify the Darwinian position by default. ...

Throughout his argument Dawkins focuses on that word perfect, maintaining that is the key contention that makes the creationists wrong and Darwinists right. I'm not defending the creationists, only pointing out weaknesses in his arguments. He stresses that not only does visual acuity change from one species to another, so do the conditions. He maintains there will be a continuum of conditions from very bad to very good and then goes into a discussion to explain the obvious. Of course visual acuity varies with distance and lighting and angle. We can't see in the dark or through the back of our head.

But then Dawkins makes a giant leap of logic. With his smoke screen about perfection in place, holding the reader's attention on the one hand, on the other hand he tries to float the whole Darwinian position past like a magician doing a magic pass. He says, "As evolution proceeds, resemblances of gradually improving perfection can therefore be favored by natural selection, in that the critical distance for being fooled gradually moves nearer."

Can a wasp copulate with an orchid from a distance? And the wasp is not a night time philanderer that can mistake a lover in the dark. And the wasp is attracted not only by shape and color but also by smell, and the size must be just right for

pollination to occur. These are highly complex variables that must be selected together in concert through parallel sets of mutations. Smell alone is as characteristic as fingerprints and so vast in its possibilities as to be virtually unlimited. Shape and size can be almost anything, and large combinations of color are possible. Yet the orchid's survival depends upon selection from this unlimited range of options, with a very specific need for an insect pollinating vector. Somehow this maze of possibilities converges upon a specific wasp sufficiently for the strategy to work, and we are asked to believe that the selection was achieved by repeated parallel sets of blind fortuitous accidents, completely at random. Remember that the Darwinian position is that mutations are rare accidents and only a rare few offer a survival advantage.

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CHAPTER V The Survival Advantage of Death

River Out Of Eden – Ch. 4 - God's Utility Function:

Dawkins flaunts double speak in grand fashion in this chapter. God's Utility Function indeed! "We cannot admit that things might be neither good nor evil, neither cruel nor kind, but simply callous—indifferent to all suffering, lacking all purpose," he says. For an example he cites the case of wasps laying their eggs in caterpillars, grasshoppers and bees so their larvae will eat the host alive while it matures. What happened to his inspirational and beautiful vision of Darwinian evolution "...incomparably more inspiring, exciting and uplifting than the story of the Garden of Eden"?

And what is the survival advantage of suffering? The capacity for suffering clearly increases up the ladder of sentient awareness, from plants to invertebrates to vertebrates, then onward with increasing conscious sensitivity up through the vertebrate series from reptile, to lower mammal, to higher mammals and humans.

No creature has ever been created to suffer more than us humans. We are born the most helpless of all, and we are obliged through our suffering to consciously learn, while primitive single-celled creatures that multiply by division triumphed painlessly in the contest of perpetuating genes a few billion years ago. They are still alive and replicating today, while all but a small fragment of subsequent species have gone extinct, vast lineages of them.

If there is utterly no purpose in all of this then what possible survival advantage can suffering have? What blind agency could there be to declare that consciousness should emerge at all, much less consciousness of pain and death? This is a complete refutation of survival. Is this accidental process of creation so malicious that it generates meaningless suffering, and progressively exaggerates it, to elevate into positions of dominance particularly perverse strains of mindless genes that possess a capacity to consciously observe their own meaningless denial in death? Is that what we human beings are?

In the same self contradictory fashion, Darwinist extremists feel justified in insisting that there is no purpose in the creative process, no meaning whatever, while at the same stroke insisting that gene survival is the only purpose, that all meaning reduces to this sole arbiter of our existence. Where is the hard evidence for making such an extreme and exclusive and self-contradictory claim that is contradicted by the evolutionary record itself? ...

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CHAPTER VI Our Celestial Prison

5- The Replication Bomb:

Dawkins begins this chapter of his book with reference to the three supernovas that have been observed in our galaxy since Chinese astronomers first documented a star exploding in 1054, to leave the Crab Nebula in its wake. He applies the analogy to the information explosion that he says has occurred on our planet, and that he calls the replication bomb, linking it to DNA. "The reason self-replication is a potentially explosive phenomenon is the same as for any explosion: exponential growth—the more you have the more you get."

Double speak creeps in again here for he jumps from DNA replication to our technological culture. We have seen that the latter is dependent upon language and is not genetically programmed by accident. It is through us, he says, "—through our brains, our symbolic culture and our technology—that the explosion may proceed to the next stage and reverberate through deep space."

But why, in the first place, are we to assume that there has been an exponential explosion of digitized information via DNA survival? If less than one percent of species have survived to the present, this indicates a growing proportionate loss of information that has been accumulating through the evolutionary process. The only way it could be preserved is if some intelligent process could reemploy the information gained from extinct lineages to enhance the evolving characteristics of surviving lineages.

We might expect an intelligent process to work in much the same way that we humans are able to reemploy the lessons we learn in one circumstance to help us cope in certain other circumstances that arise in the future, since different experiences are frequently presented to us with inherently similar characteristics. Intelligent creatures are endowed with memories and a capacity for recall that permits the spanning of space and time. To the extent that we can understand the ever changing stream of circumstance we can tailor old memories to reapply similar techniques to new situations. Memories are not hard wired to the thought process, since the abstract concepts of thought are not hard wired.

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CHAPTER VII Introducing Some New Ideas

Atoms, Stars, Galaxies:

It is not enough to harshly criticize the hard line Darwinian view and leave it at that. Anyone can find fault. It is necessary also to suggest a more meaningful alternative that is consistent with the evidence at our disposal. With this objective in mind let us proceed to examine in broad outline an intelligent face that seeks recognition in the evolutionary record. To do this it is also necessary to reach back to our origins in the stars, for that is where our story begins. We are creatures of the cosmos.

Earlier I introduced the idea of historic integration, the integration of space and time as a theme inherent in the evolutionary order.

The plants have worked out the spatial integration of the form of cells working together, including a large variety of possible sizes and shapes in multi-celled plants. The invertebrates have explored time-like motor-sensory routines involved in actively integrating experience. They sense the environment and respond dynamically to it over a huge range of circumstances. Vertebrate evolution has focused on the integration of spatial and temporal organization in a relatively fixed body plan that can progressively modulate behavior at ever more conscious levels of ideation. This results in the integration of history according to the hierarchy idea, routine and form which is inherent in the evolutionary process to begin with. Self-similarity pervades the cosmic order.

Let's look more closely at the biosphere and the evolutionary process from plants to invertebrates to vertebrates to humans. We have previously seen that this represents the progressive delegation in steps back up the hierarchy idea->knowledge->routine->form, similar to the way it worked in Hank's company. ...

The self-similarity of the System has been pointed out. In System 4 it means that we should be able to identify four levels within each level in the hierarchy. Let's begin with a brief introduction to the plants, and then we will explore them more thoroughly in the next chapter. ...

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CHAPTER VIII The Plants

Exploring the spatial forms of the eukaryotic cell.

Form-form:

This first level in the universal hierarchy includes primitive plants, consisting of the huge variety of algae, from microscopic unicellular varieties to giant kelp (apart from the cyanobacteria, often called blue-green algae, but which are in fact photosynthetic bacteria). Also included in this form-form level of plants are the fungi, slime molds, and the lichens.

Fungi will be considered as an involutionary variant of early plants that subsequently evolved in parallel with them. Fungi cannot photosynthesize the nutrients that they need so they are dependent on green plants for food. But their spores are everywhere, growing whenever they find a food source such as dead plant life, and they assist the decay of organic matter through their digestive processes that extract the energy they need. They provide a vital function in this involutionary process of decay. Most fungi are thus benign saprotrophs utilizing the waste of evolutionary variants, but some are parasites on living plants and animals.

The algae, in parallel with the fungi, explored the eukaryotic format, predominantly in the sea and fresh water lakes and streams. Small simple forms first began to pioneer on land about five hundred million years ago. The simplest unicellular forms of algae reproduce by cell division with more complex forms developing alternate sexual and asexual generations, called the gametophyte and the sporophyte. Both sexual and asexual reproduction of some kind generally occurs in algae.

The reproductive processes of fungi are considerably more varied, especially since the mycelium or body of many fungi is not partitioned into separate cells, but consists of branching hyphae, or filaments. These filaments grow at their tips, like a maze of

intertwined tributaries, to form the body of the fungus. The cytoplasm circulates nutrients through the mycellium which may have many nuclei containing different genetic material. Two groups of higher fungi, the Basidiomycotina, such as toadstools, coral fungi and fairy clubs, and the Ascomycotina, such as morels and truffels, produce elaborate fruiting bodies made up of a mass of hyphae that rise like a crown above a base. They pioneered the classic root-trunk-top structure that is so typical of terrestrial plants, but without highly differentiated cell types employed in their separate organs.

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CHAPTER IX The Invertebrates

Exploring sensory-motor routines in space and time.

Once again we may define subsumed levels within the routine level associated with the invertebrates, so that we may speak of a routine-form level, a routine-routine level, a routine-knowledge level, and a routine-idea level.

Routine-form:

The parallels that derive from the self-similarity of the evolutionary hierarchy become clearly evident as we proceed to the routines worked out by the invertebrate animals. The hierarchy keeps elaborating within itself in a self-similar way.

As we mentioned with the discussion on early plants, we can include as invertebrate animals the single-celled protists or protozoa that do not photosynthesize energy from the sun and that have a degree of motility and ingest food, such as the amoebas and the ciliates. We may say that these early invertebrate animals were the first to diverge from plants, and that they were the first to sense their environment and actively respond to it in order to acquire their needs. The basic form of the routine level of sensory-response was thus first explored by these early invertebrates.

The ciliates, such as the paramecium, are especially interesting. They generally have two sets of nuclei, a large macronucleus and from 1 to as many as 80 micronuclei. Paramecia reproduce by cell division, but they also have elaborate sexual behavior. Two of them occasionally fuse tightly in the oral region of the body and each exchanges an equal amount of DNA before again going their separate ways with a revised set of genetic material. This is a sexual process of genetic recombination but it is not a reproductive process. No new cells are created. However if they are not allowed to conjugate periodically in this way they cannot live through more than about 350 cell divisions.

Some ciliates have the equivalent of legs. The hair-like cilia that protrude from their cell membranes fuse together and move in a coordinated manner that allows them to walk over surfaces.

Some ciliates are amazingly complex for single cells. One called "Diplodinium dentatum" has complex mouth parts leading to a gut, with a contractile esophagus and anus. It also has a skeleton, like a tiny backbone within the cell. Some of these highly specialized ciliates live in the digestive tracts of cows and other hoofed mammals, and may be examples of resonant developments between lower and higher levels in the evolutionary hierarchy, as the mammals evolved. ...

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CHAPTER X The Vertebrates

Exploring knowledge of emotive behavior.

Knowledge-form:

The hagfish and lampreys are the last survivors of the earliest vertebrates: the jawless fish, called agnathans. Early versions of jawless fish became widespread in the seas of the Cambrian and Ordovician periods some 500 million years ago, but they were quite different from their modern descendants. They had thick bony plates covering their bodies that probably evolved as a defense against giant sea scorpions two meters long with pincers that could crush an unprotected animal. These early fish began to give way to the cartilaginous fish, such as the sharks, and the bony fishes, beginning in the Devonian period, about 400 million years ago.

By the mid Devonian, about three hundred and eighty million years ago, some species of fish had developed both gills and lungs, together with fins that were attached to four lobes that contained bones and muscles inside. These lobe fins could be used for crawling, so these fish could breathe air and drag themselves over land for short distances. It is believed that amphibians developed in a gradual way from these lobe-finned fish by random mutations, although amphibians go through a tadpole stage and their skeletal structures are refined into leveraged jointed legs and digits, together with a host of other differences.

In any case, by the late Devonian a few amphibians had established themselves on land with the well defined jointed quadruped limb structure that we know today. They could lift their bodies off the ground and walk, and they had a strong rib cage with adaptations to keep their organs from collapsing under their weight. They also had a shoulder collar separate from a head, so that they could move the latter independently. Amphibians became dominant land animals in the swamp forests of the Carboniferous period, a few reaching lengths of over four meters. They were weak-jawed lizard-like creatures that developed through a tadpole stage.

The vertebrate head brain consists of cerebral hemispheres that have blossomed above primary structures closely associated with the brain stem at the top end of the spinal cord. The autonomic nervous system also developed in concert with the cerebral hemispheres. The cerebral hemispheres became progressively more convoluted as their surface area increased in the higher vertebrates. The external surface layer of the hemispheres is associated with higher levels of consciousness and intelligence. This outer rind of the hemispheres consists of densely packed layers of nerve cells a few millimeters thick, called the cortex, hence the term cerebral cortex. In humans it contains a few hundred billion nerve cells. The two hemispheres function with a degree of independence and yet they are interconnected through nerve bundles called commissures, the largest by far being the corpus callosum.

Previously it was pointed out that the cerebral hemispheres, including the cortex, developed in three stages associated with the reptile, the lower mammal and the higher mammal. These three developments, old, median, and new, correspond to what are called the archicortex, the mesocortex, and the neocortex, all of which were present in undeveloped form in early vertebrate amphibians. Although the three brains were undeveloped, they represented an indication of developments to follow. In other words they indicated a development plan anticipating events far in the future. ...

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CHAPTER XI Humans

Exploring ideas integrating space and time.

Idea-form:

The idea at the top of the sentient hierarchy is the evolution of humanity with a capacity for creative ideation. It is abundantly apparent from our global undertakings that no other animal species has comparable creative capacities, even though some may be highly intelligent. With this capacity also comes a burden of responsibility, for as a species we must sooner or later learn to bridge the gulf between self and other, and exercise restraint to make room for our animal brothers. This imperative is already structured into our limbic system anchoring us firmly to our reptilian and mammalian roots in the biosphere. We become spiritually impoverished as we indiscriminately propagate, pollute, and push species after species to extinction. We cannot survive as a species alone. The biosphere lives in our heart.

At the same time, creative ideas must have a capacity to integrate experience in ways that help people to cope with the changing flux of circumstance. They require an insight into the cosmic order of things. Ideas must span space and time, in the sense that they must anticipate the future while at the same time finding a degree of consistency and harmony with our evolutionary roots in the biosphere. Ideas must join heaven and earth, so to speak.

Sustainable ideas about how best to cope with circumstance evolve through social implementation. Involuntary traits always creep in and they must eventually face resolution. In keeping with the universal and particular aspects of experience, ideas also have both collective and individual characteristics. This involves both left-brain social and right-brain intuitive mind sets that each individual uniquely explores in their own fashion. We are attuned like radio sets to cultural and spiritual themes, and our cerebral hemispheres are our biospheric antennae.

Ancestral cultures, prior to the time when farming and the first complex civilizations began to appear, explored many languages and with them the basis of conscious meaning. This included the fundamentals of human values that are woven into the fabric of humanity today. These early cultures encompassed a great span of humanity's conscious history and they continue to work their influence through the bond that makes us all human, even across the years. For more than twenty-five thousand years since we became the sole beneficiaries of the planet, the only modern humans were tribal nomads that roamed the extremities of the planet seeking out their daily sustenance and gauging their impressions of the land.

Prior to what is recognized as the emergence of the first civilizations, in the Near East less than ten thousand years ago, spirit cultures had explored the farthest reaches of the planet. It is significant that for most of this time the Western Hemisphere was left untouched by human intrusions. The human adventure began there only as the last ice-age went into recession, about fifteen thousand years ago.

Downsizing Darwin



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